

29.06.2015

Monday 4:00 pm

Max-Planck-Institut für Radioastronomie

Auditorium 0.02

Auf dem Hügel 69 | 53121 Bonn

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Star Cluster System Dynamics as a Probe into Star Formation

Star clusters constitute a major channel of star formation in the local Universe. And as groups of largely coeval stars, they can be detected against the background of their host galaxy, and age-dated. They are therefore vital tracers of the process of star formation, as well as of the history of galaxies. As time goes by, however, star clusters steadily lose their stars and, eventually, get completely dissolved, a process which depends sensitively on their formation conditions. A thorough understanding of cluster formation conditions is therefore urgently needed to reconstruct the star formation history of galaxies from the encoded record left by their surviving star clusters.

In this presentation, I will show how the properties of star cluster systems can be exploited to probe into the formation conditions of star clusters. Specifically, I will build on the evolution with time of the cluster mass distribution to constrain the mass-radius relation of clusters at birth, and to explain the limit for massive star formation observed in the mass-radius space of molecular structures. These results have stimulated the development of a new model for cluster formation. Not only is this model able to explain the steep relation between the local surface densities of molecular gas and young stellar objects of the Solar Neighbourhood, it has also prompted us to reassess the ability of clusters to survive the expulsion of their residual star-forming gas. Stellar age spreads in clusters as a function of their mean volume density will also be discussed.

